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EDITORIALS.

THE publication of Professor Wright's *Man and the Glacial Period* has been the occasion of much discussion concerning some of the questions with which the book deals. The numerous and somewhat elaborate reviews have criticized adversely many points in the volume; and in spite of the fact that Professor Wright has responded to most of the reviews, and in spite of the fact that both reviews and responses have been reviewed with loud professions of disinterested impartiality, it can hardly be claimed that any specific criticism of the book has been really met. The errors which have been pointed out, some of them trivial, many of them fundamental, still remain. The unjust claims and the misrepresentations of the volume deserved the measure of criticism they have received.

It was especially the author's handling of the evidence concerning the sequence of events in the glacial period, and concerning man's antiquity in terms of geology, which occasioned the somewhat prolonged discussion. Professor Wright is certainly entitled to his opinion on both these questions, as on all others. So far as we know, this right has not been disputed. The point of criticism at the outset was that the author did not fairly represent the present state of scientific opinion on these two questions, in a book which especially professed to set forth the present status of the problems with which it dealt. The justice of the criticisms made on this basis can not be questioned. The attitude of the reviewers, or at any rate the attitude of those who called forth the discussion, was not so much that there were two or more glacial epochs, though they indicated that this was their belief, as that the author had failed to adequately present the evidence bearing on the question, and had left the discussion on this point in such shape as to mislead the public, for

whom the book was professedly written, concerning the real condition of scientific opinion. The attitude of the reviewers who first criticized the work was not that glacial man did not exist, but that the author had failed to represent the present state of scientific opinion on this question, and that existing evidence does not, in the minds of many competent observers, bear out the conclusion which Professor Wright advances, and which he advances as if it were not open to question. Instead of answering or attempting to answer the criticisms passed on the book, the responses to the reviews, and the reviews of the reviews have diverted, or attempted to divert, attention from the real criticisms, to other matters. They have shifted, or attempted to shift, the discussion from the *presentation* of the above questions in the volume under review, to the merits of the questions themselves. Shifted to this basis, the questions at issue are very different from those first raised, and may continue to be discussed long after *Man and the Glacial Period* has ceased to attract attention.

If the discussion is not at an end, it is presumably near it. Incidentally, two questions which had previously been clearly recognized and sharply emphasized by specialists have been brought into greater popular prominence than heretofore. The one question concerns the simplicity *versus* the complexity of the glacial period. The other concerns the nature of the evidence which is to be admitted into court touching the question of man's geological chronology. The first of these questions has been long before the geological world, and little that is new has been added in connection with the recent discussion. What has been said will be likely to stimulate the accumulation and critical consideration of data bearing on the question.

Concerning the question of man's antiquity in terms of geological history, the discussion has for the first time sufficiently emphasized in the popular mind the importance of the most rigid scrutiny of the evidence which claims to mark a definite stage in geological history when man's existence is beyond question. For the first time, the criteria by which such evidence

must be judged, have been widely discussed. These criteria are not new to the specialists who had earlier defined and used them. But not until now had it been so clear to so large an audience that the evidence concerning man's antiquity is primarily geological, and more than this, that it involves some of the nicest and most particular questions with which geologists have to deal.

R. D. S.

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THE article of Mr. Leverett in this number gives occasion to invite attention to certain errors that still linger in the literature of the glacial period, and that are occasionally supplemented by new ones of like nature. They grow out of the failure to distinguish between the Champlain depression and the earlier depression during which the main silts of the Mississippi Valley were deposited. A very large mass of evidence has been presented by different investigators under different auspices during the past decade that seems to us to have completely demonstrated a stage of elevation between the time of the main silt depositions associated with the outer tract of drift in the interior basin, and the time of the low-altitude formations of the St. Lawrence basin of which the deposits of the Champlain valley are the type. This stage of elevation embraced some of the most important events of the glacial period. The two stages of depression, we think, have thus been proved to be altogether distinct. In our judgment they were separated by a long interval of time, but it is not important to insist upon this in this connection. The evidences of this elevation between the two stages of depression embrace practically all the great glacial gravel trains of high gradient that are found south of the St. Lawrence basin. The nature and slope of these give clear testimony to the attitude of the land at the time of their formation. It is not asserted that there were not similar trains connected with the early stages of the earlier invasion of the ice, but the evidence on this point is as yet very scant. It certainly does not embrace the well-known high-gradient valley deposits of the interior, for these lie in valleys cut in the earlier drift and are connected with moraines that lie

north of it, except at those points at which the later drift reaches the border of the earlier. The moraines from which these high-gradient trains of gravel take their origin lie between the two areas of depression-deposits, and there is abundant and clear evidence that they were later than the one and earlier than the other. The phenomena connected with the earlier depression should, therefore, be considered quite independently of the Champlain depression. None of the agencies of the later depression can be legitimately appealed to in explaining the formations of the earlier depression. The confusion of the past, which is pardonable, should be eliminated, and further confusion avoided by the recognition of the distinctness of the two depressions.

T. C. C.